Spot Safety Project Evaluation

Project Log # 200512156

Spot Safety Project # 05-97-068

Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of SR 2542 (Rock Quarry Rd) and
SR 2555 (Auburn/Knightdale Rd)
Wake County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 11/21/2006
Brad Robinson, EI Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 05-97-068 – The Intersection of SR 2542 (Rock Quarry Rd) and SR 2555 (Auburn/Knightdale Rd) in Wake County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a traffic signal. SR 2542 (Rock Quarry Rd) and SR 2555 (Auburn Knightdale Rd) are both 2-lane roads with no left-turn and speed limits of 55 mph and 45 mph, respectively. The subject intersection is a 4-leg intersection which was controlled by stop signs on SR 2555 (Auburn Knightdale Rd) in the before period.

The original statement of problem was that crashes were occurring because vehicles on SR 2555 had insufficient gaps in traffic to enter the intersection safely. A North Carolina Representative originally submitted the request for the traffic signal.

The initial crash analysis was completed from October 1, 1994 to September 30, 1997 with 14 reported crashes, including 12 that were considered correctable by the chosen countermeasure. The final completion date for the improvement at the subject intersection was on October 14, 1998 with a total cost of $35,000.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from September 1, 1998 to November 30, 1998. The before period consisted of reported crashes from March 1, 1991 through August 31, 1998 (7 years and 6 months) and the after period consisted of reported crashes from December 1, 1998 through May 31, 2006 (7 years and 6 months). The ending date for this analysis was determined by the available crash data at the time the analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Total crashes	29	16	-44.8
Total Severity Index	13.43	14.18	5.6
Target Crashes	26	12	-53.8
Target Crash Severity Index	14.58	17.95	23.1
Volume	5,000	8,800	76.0
Crash Severity Summary			
Fatal injuries	1	0	-100
Class A injuries	2	2	0
Class B injuries	9	1	-88.9
Class C Injuries	9	7	-22.2
Total Non-Fatal Injuries	8	6	-25

The naive before and after analysis at the treatment location resulted in a 45 percent decrease in Total Crashes, a 54 percent decrease in Target Crashes, a 5.6 percent increase in the Total Severity Index, and a 76 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1994 and the after period ADT year was 2002.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 45 percent decrease in Total Crashes and a 54 percent decrease in Target Crashes, with a 76 percent increase in ADT. The Total Severity Index increased by 5.6 percent and the Target Crash Severity Index increased by 23 percent. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

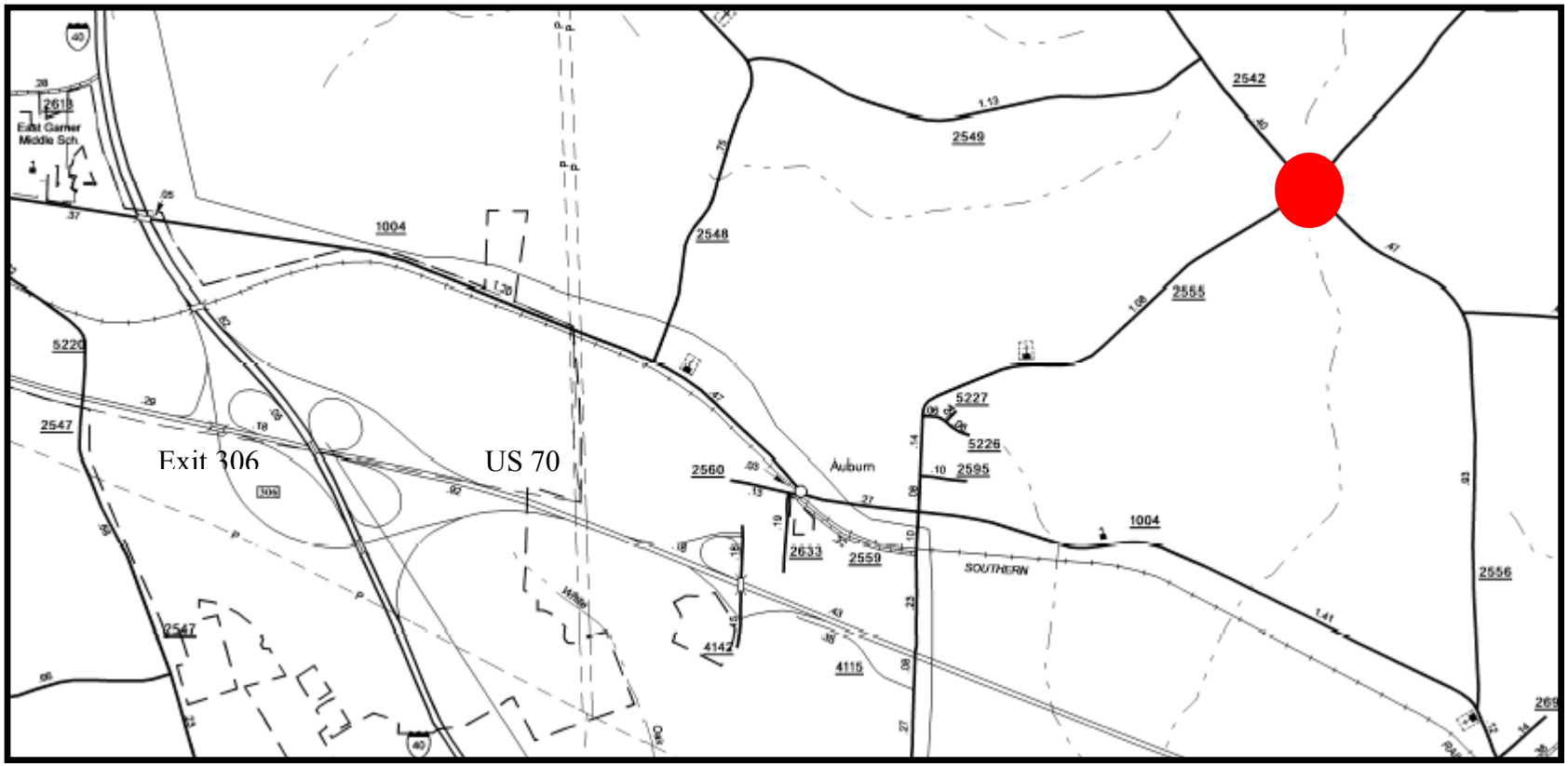
Referencing the *Collision Diagrams*, all existing crash patterns in the before period were either reduced or eliminated by the installation of the traffic signal.

Left Turn, Same Roadway crashes increased 150 percent from the before to the after period (from 2 to 5). There does not appear to be any other crash patterns created by the signal. Rear-End Crashes approaching the intersection stayed constant at one crash both in the before and the after periods.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Location Map
Wake County
Evaluation of Spot Safety Project 05-97-068



Treatment Location: SR 2542 (Rock Quarry Rd) and SR 2555 (Auburn Knightdale Rd) east of Raleigh

Treatment Site Photos Taken October 11, 2006

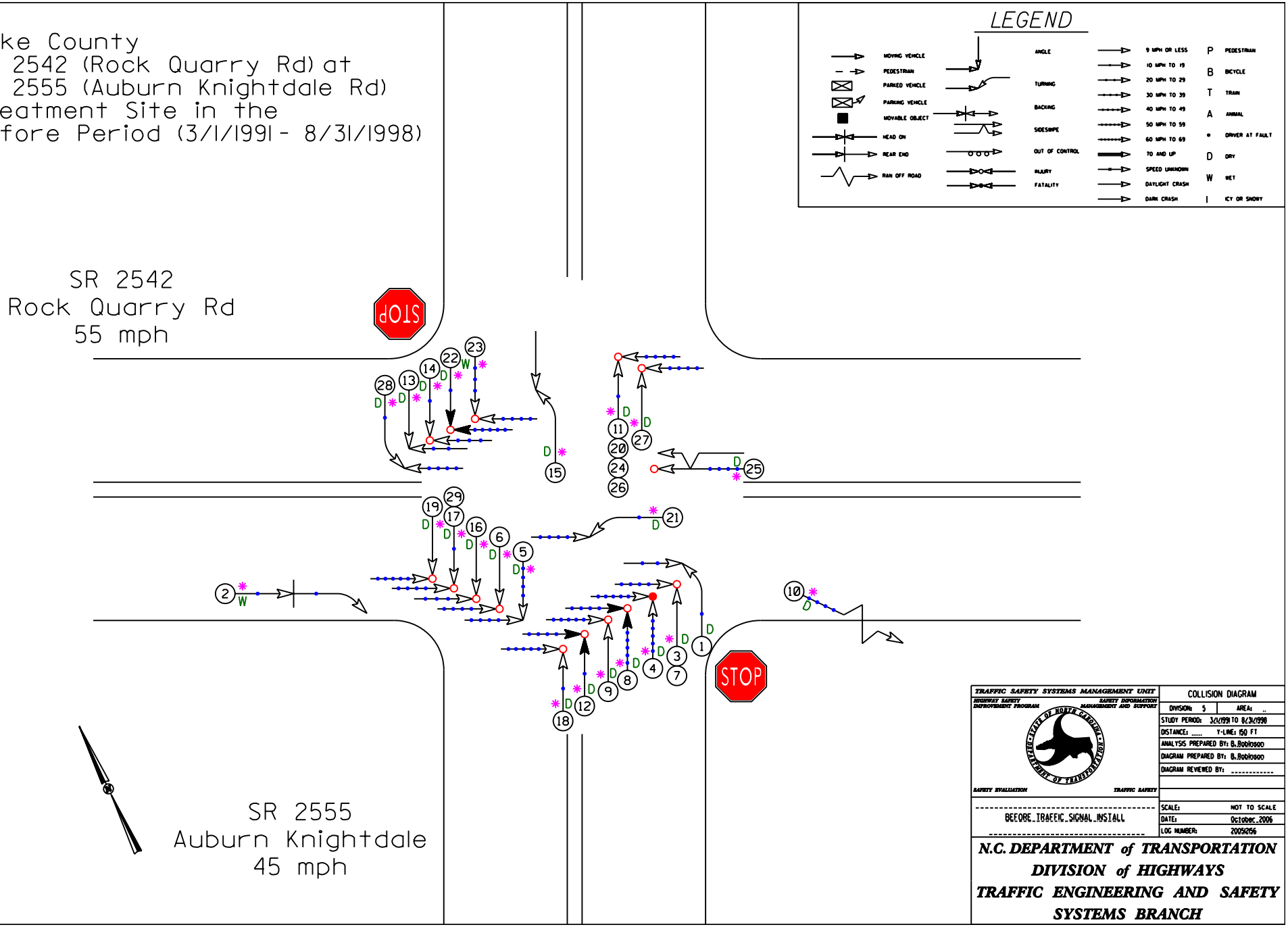
Looking Eastbound on SR 2542 (Rock Quarry Rd)

Looking westbound on SR 2542 (Rock Quarry Rd)

Looking Northbound on SR 2555 (Auburn/Knightdale Rd)

Looking Southbound on SR 2555 (Auburn/Knightdale Rd)

Wake County
SR 2542 (Rock Quarry Rd) at
SR 2555 (Auburn Knightdale Rd)
Treatment Site in the
Before Period (3/1/1991 - 8/31/1998)



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY

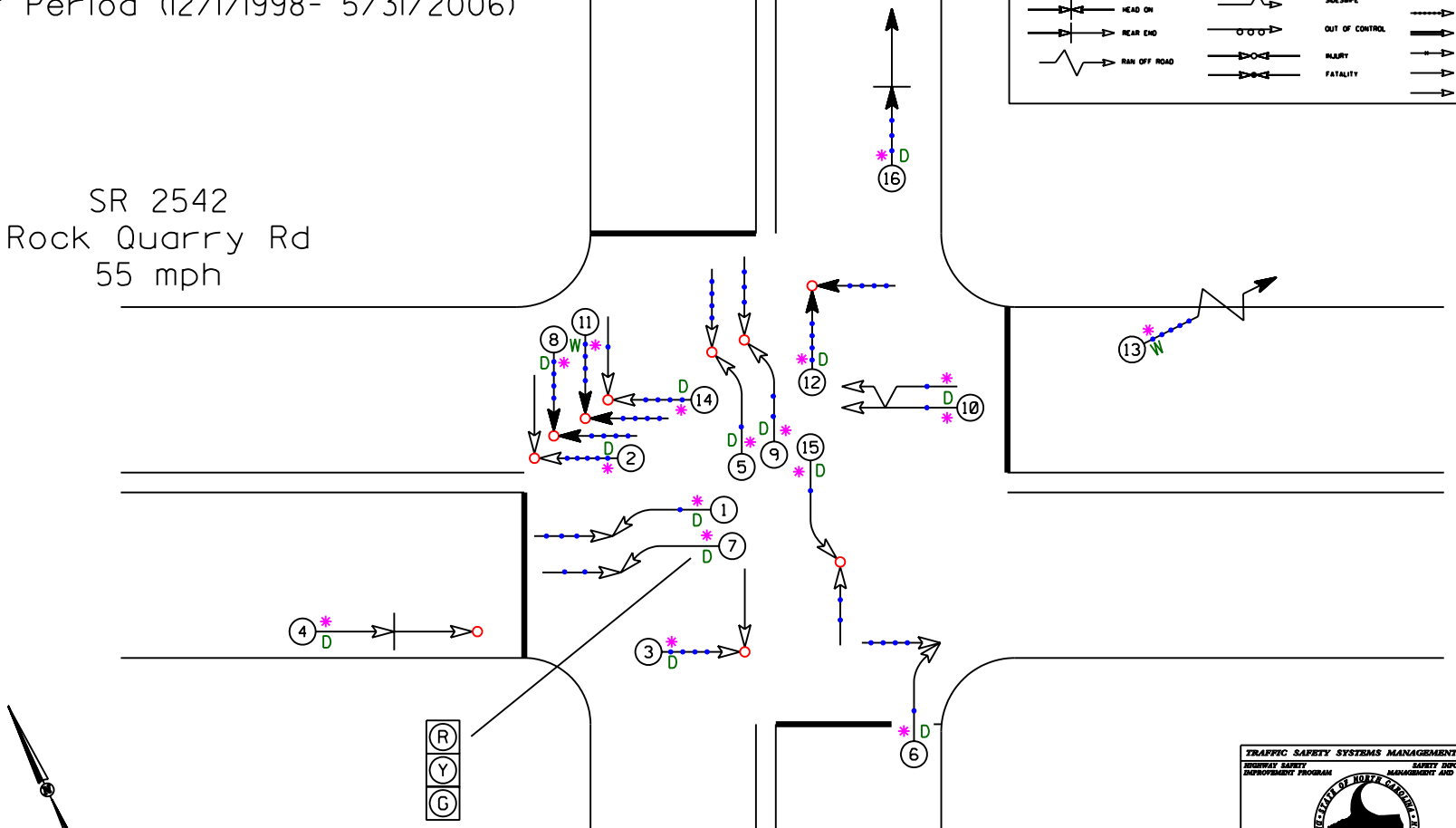
BEFORE TRAFFIC SIGNAL INSTALL

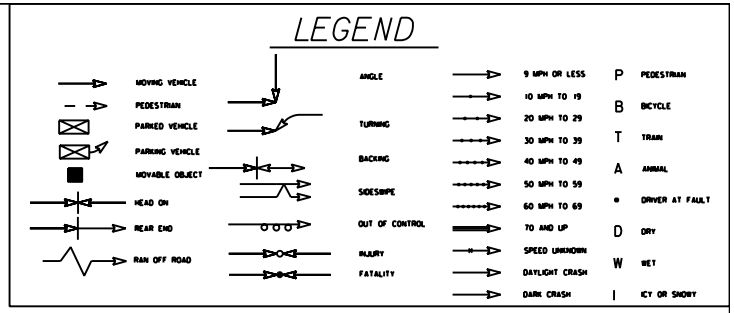
COLLISION DIAGRAM

DIVISION: 5	AREA: ..
STUDY PERIOD:	3/1/1991 TO 8/31/1998
DISTANCE:	Y-LINE: 150 FT
ANALYSIS PREPARED BY:	B.Robinson
DIAGRAM PREPARED BY:	B.Robinson
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE:	October 2006
LOG NUMBER:	20052156

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

Wake County
SR 2542 (Rock Quarry Rd) at
SR 2555 (Auburn Knightdale Rd)
Treatment Site in the
After Period (12/1/1998- 5/31/2006)





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COLLISION DIAGRAM

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ANALYSIS PREPARED BY: B.Robinson	
DIAGRAM PREPARED BY: B.Robinson	
DIAGRAM REVIEWED BY: ----------	
SCALE:	NOT TO SCALE
DATE:	October 2006
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AFTER TRAFFIC SIGNAL INSTALL

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